

Antenna System and Digital Acquisition System for Enabling Ice Sheet 3D Tomography, Phase I

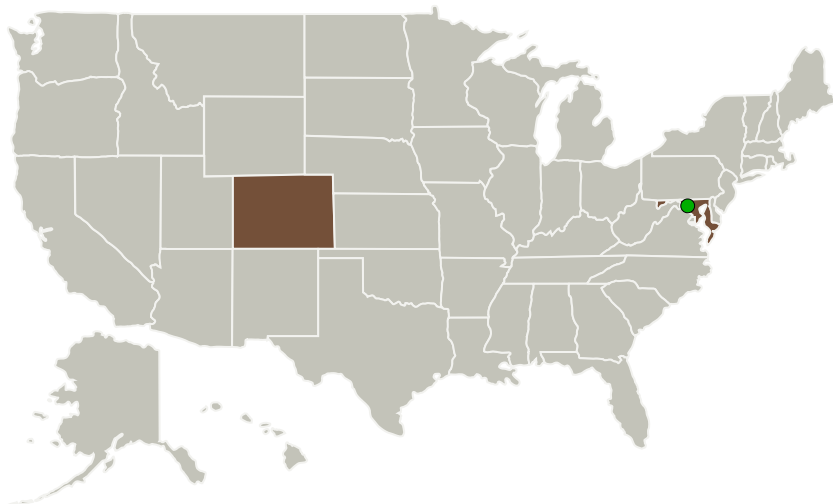
Completed Technology Project (2011 - 2011)



Project Introduction

The concept of using SAR data to form 3D tomographic images has been developed over the last decade, but the enabling technology has been slow to progress. Current 3D tomographic data gathering techniques require multiple flight passes to gather data at different phase centers. The two technology advancements proposed enabling improvements in the collection of SAR data for ice-sounding and subsurface exploration are compact, multi-band HF/VHF antennas and multi-channel data acquisition systems. Multi-band antennas enable a single antenna to be used over both spectrums most often used for subsurface exploration; their compact design facilitates the placement of multiple antennas on a single platform to enable data collection at multiple phase centers. This advancement is complemented by the development of a multi-channel data acquisition system, which enables the simultaneous collection of data at multiple phase centers. Collecting data simultaneously at multiple phase centers improves data collection by reducing instabilities in measurement locations produced by varying flight paths. Additionally, cost of collection is reduced due the minimization of flight time needed to collect data. Phase I will include the development, fabrication and testing of the antenna system (TRL3 ➔ TRL6), while forming a concept design for the multi-channel acquisition system (TRL1 ➔ TRL2).

Primary U.S. Work Locations and Key Partners



Antenna System and Digital Acquisition System for Enabling Ice Sheet 3D Tomography, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

Antenna System and Digital Acquisition System for Enabling Ice Sheet 3D Tomography, Phase I

Completed Technology Project (2011 - 2011)



Organizations Performing Work	Role	Type	Location
Free Space Research	Lead Organization	Industry	Westminster, Colorado
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Colorado	Maryland

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138006>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Free Space Research

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

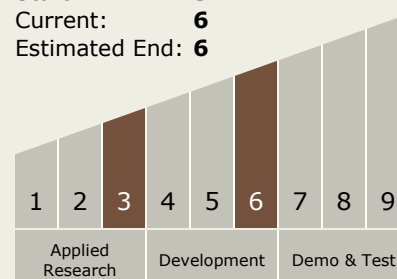
Carlos Torrez

Principal Investigator:

Timothy P Rink

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Antenna System and Digital Acquisition System for Enabling Ice Sheet 3D Tomography, Phase I

Completed Technology Project (2011 - 2011)



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.2 Radio Frequency
 - └ TX05.2.6 Innovative Antennas

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System